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Drawn up in Paris, **21 JUNE 2005**

On behalf of the Director-General of the
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The Patent Department Head

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REQUEST FOR GRANT

page 1/2

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3 TITLE OF THE INVENTION (200 characters or spaces maximum) MACHINE FOR GATHERING PRODUCTES SUCH AS GRASS			
4 PRIORITY DECLARATION OR APPLICATION FOR THE BENEFIT OF THE FILING DATE OF A PRIOR FRENCH APPLICATION		Country or organisation Date ____/____/____ No. _____ Country or organisation Date ____/____/____ No. _____ Country or organisation Date ____/____/____ No. _____ <input type="checkbox"/> If there are other priorities, tick the box and use the "continuation" form	
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The inventors are the applicants	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No In this case, fill in the Designation of inventor(s) form
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Description

The present invention relates to a machine for gathering in groups products such as grass, hay or straw, which are laid on the ground, comprising in particular a main frame bearing a first lateral gathering device with which a first windrowing device is associated and a second lateral gathering device with which a second windrowing device is associated.

A known machine of this kind allows products already gathered into windrows to be gathered together and displaced laterally. They can then be deposited on one side or both sides of the machine to form windrows of larger volume.

This machine is, in particular, not appropriate for gathering products spread over the entire surface of the ground. Its field of use is therefore relatively restricted.

It is an object of the present invention to remedy the disadvantages of the known machines. The present invention intends in particular to provide a machine which is both capable of gathering products already in windrows and products spread over the entire surface of the ground.

To this end, an important feature of the invention consists in the fact that the main frame additionally bears a central gathering device with which a third windrowing device is associated and in the fact that said central gathering device and said third windrowing device can be moved relative to the frame in such a way that they can be transposed into a first position in which they are aligned with the first and second gathering devices and windrowing devices and into at least a second position in which they are offset

relative to said first and second gathering devices and windrowing devices. In this second position, the central gathering device and the third windrowing device can, in particular, be offset heightwise.

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In the first position, the gathering devices gather the products over the entire width of the machine. These products may thus be spread over the surface of the ground or alternatively may be in the form of small-volume windrows already formed, for example, by means of a mower/windrower. The gathered products therefore reach the windrowing devices which displace them laterally from one to the other and deposit them on one of the sides of the machine in the form of a large windrow.

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In the second position, the first and second gathering devices gather the products which are laid on the ground in the form of small-volume windrows and cause them to reach their respective windrowing devices. The latter can then be driven in such a way that they displace these products toward the center of the machine in order to form a central windrow of larger volume. It is, however, also possible to drive the windrowing devices in such a way that they displace the products towards the outermost sides of the machine with a view to forming large windrows in several passes.

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According to another feature of the invention, the third windrowing device is associated with a deflector which can be moved with respect to said windrowing device. This deflector is arranged in such a way that it moves automatically from a more or less vertical position that it occupies when the central gathering device and the third windrowing device are in their first position, into a more or less horizontal position

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when said devices are occupying their second position, and vice versa.

5 Other features and advantages of the invention will become apparent from the description which will follow and which refers to the attached drawings which, by way of nonlimiting examples, depict a number of embodiments of the machine according to the invention.

10 In these drawings:

- figure 1 depicts a partial view from above of a machine according to the invention in the work position,
- figure 2 depicts, on a larger scale, a view from
15 above of the central gathering device of the machine,
- figure 3 depicts a side view of the central gathering device illustrated in figure 2,
- figure 4 depicts a view similar to that of figure 3, with the central gathering device in another
20 position,
- figure 5 depicts a side view of an embodiment variant of the central gathering device,
- figure 6 depicts a view similar to that of figure 5, with the central gathering device in another
25 position.

As depicted in figure 1, the machine according to the invention comprises a main frame (1). This consists of a central beam (2) which has, at its front end, a
30 coupling system (not depicted) for attaching it to a tractor that drives the machine and causes it to move along in the direction of forward travel (A). The beam (2) at its rear end has a crossmember (3) with two landwheels (4, 5) resting on the ground. This beam (2)
35 additionally comprises two lateral supports (6 and 7) on which arms (8 and 9) are articulated by means of axles (10 and 11) which are more or less parallel to the beam (2). Between the beam (2) and the arms (8 and

9) there are also some hydraulic rams (12 and 13) to allow these arms (8 and 9) to be moved about said axles (10 and 11) in more or less vertical planes.

5 The outside end of the first arm (8) bears a first gathering device (14) of the pick-up type with which a first windrowing device (15) is associated. These two devices (14 and 15) form an assembly that can move over the ground by means of wheels or skids situated under
10 said devices.

The outside end of the second arm (9) bears a second gathering device (16) of the pick-up type with which a second windrowing device (17) is associated. These also
15 form an assembly that can move over the ground by means of wheels or skids placed under said devices (16 and 17).

The main frame (1) additionally bears a central
20 gathering device (18) of the pick-up type with which a third windrowing device (19) is associated. Each windrowing device (15, 17 and 19) consists of a conveyor belt guided by rolls (20). One of the guide rolls (20) of the conveyor belt of each of the
25 windrowing devices (15, 17 and 19) is rotationally driven, for example by means of a hydraulic motor (21), in such a way that the corresponding belt moves in its upper part to the right or to the left. The gathering devices (14, 16 and 18) of the pick-up type may also be
30 driven by hydraulic motors.

The central gathering device (18) and the third windrowing device (19) are arranged in such a way as to be movable heightwise relative to the main frame (1).
35 They may thus be transposed into a first position in which they are aligned with the first and second gathering devices (14 and 16) and the first and second windrowing devices (15 and 17), and into a second

position in which they are offset relative to said first and second gathering devices (14 and 16) and windrowing devices (15 and 17). In this second position they may be offset heightwise so that they are out of operation, that is to say do not come into contact with the products. The central gathering device (18) and the third windrowing device (19) are connected to the main frame (1) by means of a lift mechanism (22) (see figures 2 to 6). This is made up of connecting arms (23, 24, 25) and of one or several hydraulic rams (26, 27). These connecting arms (23, 24, 25) are articulated to the main frame (1) by means of axles (28) and are articulated to the third windrowing device (19), which is connected to the central gathering device (18), by means of axles (29). These articulation axles (28 and 29) are more or less horizontal and perpendicular to the direction of forward travel (A). The hydraulic rams (26 and 27) are articulated to the main frame (1) by means of axles (30) and are articulated to the connecting arms (23 and 25) by means of axles (31). These axles (30 and 31) are more or less parallel to the articulation axles (28 and 29) of the connecting arms (23, 24 and 25).

The connecting arms (23, 24 and 25) lie in two planes (B and C) offset relative to one another in the heightwise direction. In the example depicted, the lift mechanism (22) comprises three connecting arms (23, 24 and 25) of which two (23 and 25) lie in the same plane (B) and of which the third (24) lies in the second plane (C). This third arm (24) lies more or less at equal distances from the other two arms (23 and 25). The lift mechanism could also comprise four connecting arms lying two in each plane (B or C).

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Deflectors (32, 33, 34) for guiding the displaced products can be arranged on the rear side of the windrowing devices (15, 17 and 19). It is apparent from

figures 3 to 6 that the deflector (34) associated with the third windrowing device (19) can be moved into at least two different positions. This deflector (34) is more or less vertical when the central gathering device (18) and the third windrowing device (19) are in their first position and is more or less horizontal when said devices are in their second position. The switch from the more or less vertical position to the more or less horizontal position and vice versa occurs automatically when the devices (18 and 19) are moved by means of the lift mechanism (22).

In the example depicted in figures 3 and 4, the deflector (34) is flexible. It is fixed at one of its ends to the third windrowing device (19) and at its other end to the beam (2) of the main frame (1). It passes over two rollers (35 and 36) of which one (35) is fixed relative to the main frame (1) and the other is able to move along the beam (2). The moving roller (36) is mounted on lateral supports (37) which can move on longitudinal guides (38) fixed to the flanks of the beam (2) of the main frame (1). At least one of the lateral supports (37) is connected to a tension spring (39) which pulls it in the direction of forward travel (A).

In the example depicted in figures 5 and 6, the deflector (34) is rigid. At one of its ends it is articulated to the third windrowing device (19) by means of a more or less horizontal axle (40). The other end of this deflector (34) has a roller (41). The latter is guided on a rail (42) which is connected to the beam (2). This rail (42) exhibits two parts (43 and 44), one of which is more or less vertical and the other of which is more or less horizontal.

During work, the machine is attached to a tractor which moves it along in the direction (A). In the first work

position the arms (8 and 9) are lowered into a more or less horizontal position with the aid of the hydraulic rams (12 and 13), so that the first and second gathering devices (14 and 16) rest on the ground. The
5 central gathering device (18) is also lowered by means of the lift mechanism (22) so that it touches the ground. The three gathering devices (14, 18 and 16) then lie side by side in the same line. They are driven in such a way that they gather the products lying on
10 the ground and convey them to the windrowing devices (15, 19 and 17). The latter also are driven and displace said products to one of the sides of the machine with a view to forming a large lateral windrow (45). The deflectors (32, 34 and 33) are more or less
15 vertical and prevent the products from slipping to the rear side of the windrowing devices (15, 19 and 17).

In the second work position, the first and second gathering devices (14 and 16) and the corresponding
20 windrowing devices (15 and 17) occupy the same positions as those described hereinabove. The central gathering device (18) and the corresponding windrowing device (19) are displaced upward, by means of the lift mechanism (22), close to the beam (2). To do this, the
25 hydraulic rams (26 and 27) are made to shorten. They therefore cause the connecting arms (23, 24 and 25) to pivot about their articulation axles (28) so that said raising is performed. The central gathering device (18) and the third windrowing device (19) are therefore
30 offset heightwise relative to the adjacent devices and are somewhat out of operation.

At the same time, the flexible deflector (34) according to the embodiment depicted in figures 3 and 4, is
35 pulled forward by the spring (39) and the moving roller (36) the lateral supports (37) of which move along the guides (38). This deflector (34) therefore folds around the rollers (35 and 36) and occupies a more or less

horizontal position between the beam (2) and the windrowing device (19).

5 In the embodiment according to figures 5 and 6, the deflector (34) is guided by the rail (42) during said raising. It therefore folds forward about the articulation axle (40) and positions itself in a more or less horizontal position between the beam (2) and the windrowing device (19) so as to allow the latter to
10 be raised as far as possible.

In this second work position, the first and second gathering devices (14 and 16) are driven in such a way that they gather the products on the ground and convey
15 them to the corresponding windrowing devices (15 and 17). The latter can therefore be driven in such a way that they displace these products towards the middle of the machine to form a central windrow in the space freed by the third windrowing device (19). They can
20 thus be driven in such a way that they displace the products towards the sides to form lateral windrows. In this second work position the machine can in particular gather small windrows and group them together to form larger windrows. The latter can then be collected, for
25 example, by means of a press or a silo loader.

For transport, the central gathering device (18) and the third windrowing device (19) are raised into the position that they occupy in the second work position
30 described hereinabove. The arms (8 and 9) with their gathering and windrowing devices (14, 15, 16 and 17) are raised about the articulation axles (10 and 11) by means of the hydraulic rams (12 and 13) so as to reduce the width of the machine.

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Obviously, the invention is not restricted to the embodiments described and depicted in the attached drawings. Modifications remain possible, particularly

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- 9 -

as regards the construction of the various elements or by substituting technical equivalents, without thereby departing from the field of protection.

Claims

1. A machine for gathering in groups products such as grass, hay or straw, which are laid on the ground, comprising in particular a main frame (1) bearing
5 a first lateral gathering device (14) with which a first windrowing device (15) is associated and a second lateral gathering device (16) with which a second windrowing device (17) is associated, characterized in that the main frame (1)
10 additionally bears a central gathering device (18) with which a third windrowing device (19) is associated and in that said central gathering device (18) and said third windrowing device (19) can be moved relative to the frame (1) in such a
15 way that they can be transposed into a first position in which they are aligned with the first and second gathering devices (14 and 16) and windrowing devices (15 and 17) and into at least a second position in which they are offset relative
20 to said first and second gathering devices (14 and 16) and windrowing devices (15 and 17).
2. The machine as claimed in claim 1, characterized
25 in that the central gathering device (18) and the third windrowing device (19) can be offset heightwise.
3. The machine as claimed in claim 1 or 2,
30 characterized in that the central gathering device (18) and the third windrowing device (19) are connected to the main frame (1) by means of a lift mechanism (22).
4. The machine as claimed in claim 3, characterized
35 in that the lift mechanism (22) is made up of connecting arms (23, 24 and 25) which are articulated to the main frame (1) by means of

axles (28) that are more or less horizontal and perpendicular to the direction of forward travel (A) and articulated to the third windrowing device (19) which is connected to the central gathering device (18), by means of axles (29) that are more or less horizontal and perpendicular to the direction of forward travel (A).

5. The machine as claimed in claim 4, characterized in that the lift mechanism (22) comprises at least one hydraulic ram (26, 27) which is articulated to the main frame (1) and to a connecting arm (23, 25).
6. The machine as claimed in claim 4, characterized in that the connecting arms (23, 24 and 25) lie in two planes (B and C) that are offset relative to one another in the heightwise direction.
7. The machine as claimed in claim 6, characterized in that the lift mechanism (22) comprises three connecting arms (23, 24 and 25) of which two (23 and 25) lie in the same plane (B) and of which the third (24) lies in the second plane (C).
8. The machine as claimed in claim 7, characterized in that the third arm (24) lies more or less at equal distances from the other two arms (23 and 25).
9. The machine as claimed in any one of the preceding claims, characterized in that associated with the third windrowing device (19) is a deflector (34) that can be moved relative to said windrowing device (19).

10. The machine as claimed in claim 9, characterized in that the deflector (34) can be moved automatically between a more or less vertical position that it occupies when the central gathering device (18) and the third windrowing device (19) are in the first position, and a more or less horizontal position that it occupies when they are in their second position.
11. The machine as claimed in claim 10, characterized in that the deflector (34) is flexible and in that it is fixed at one of its ends to the third windrowing device (19) and at its other end to the main frame (1).
12. The machine as claimed in claim 11, characterized in that the deflector (34) passes over two rollers (35 and 36) of which one (35) is fixed relative to the main frame (1) and the other (36) can move along the main frame (1).
13. The machine as claimed in claim 12, characterized in that the moving roller (36) is mounted on lateral supports (37) that can move on guides (38) fixed to the main frame (1).
14. The machine as claimed in claim 13, characterized in that at least one lateral support (37) is connected to a tension spring (39).
15. The machine as claimed in claim 10, characterized in that the deflector (34) is rigid and in that it is articulated at one of its ends to the third windrowing device (19) by means of an axle (40).
16. The machine as claimed in claim 15, characterized in that the other end of the deflector (34) is

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guided by means of a roller (41) on a rail (42)
fixed to the main frame (1).

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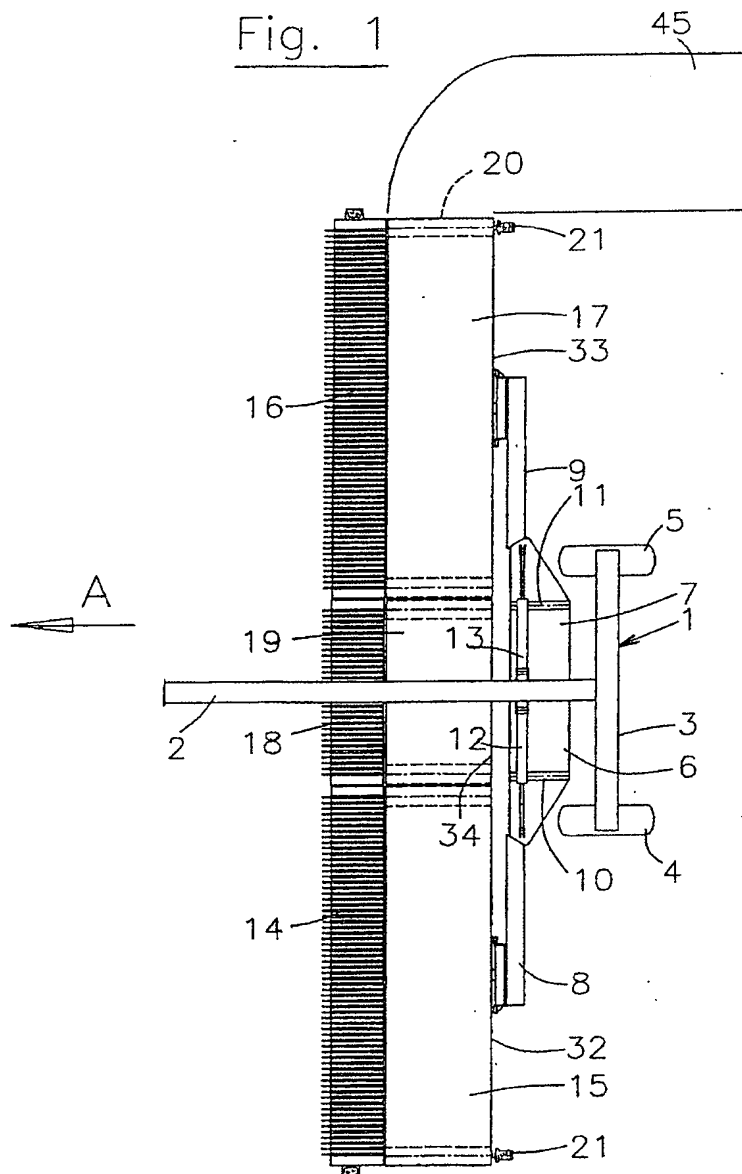


Fig. 2

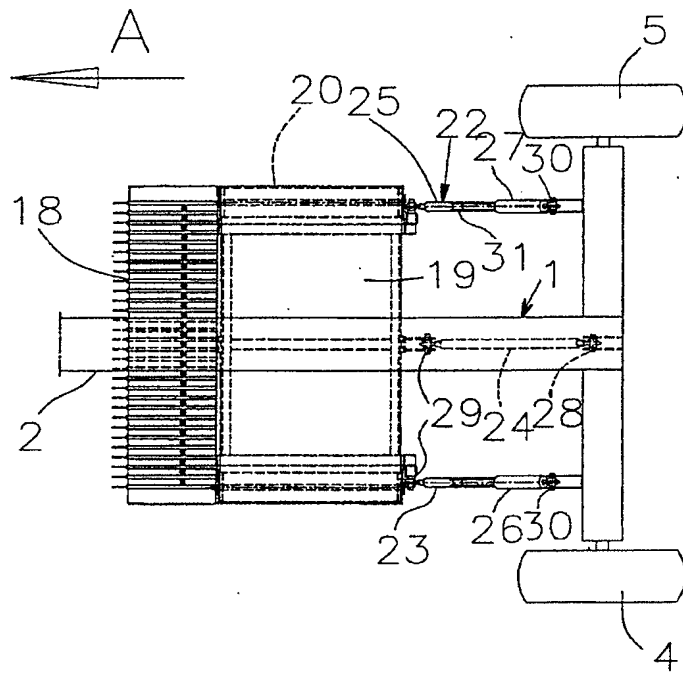


Fig. 4

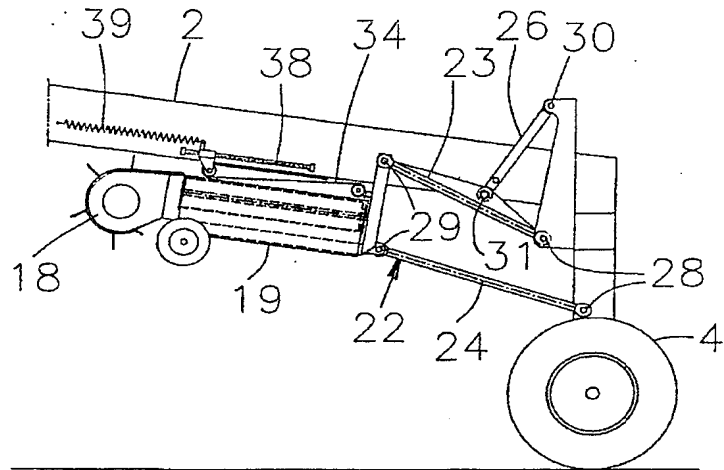


Fig. 3

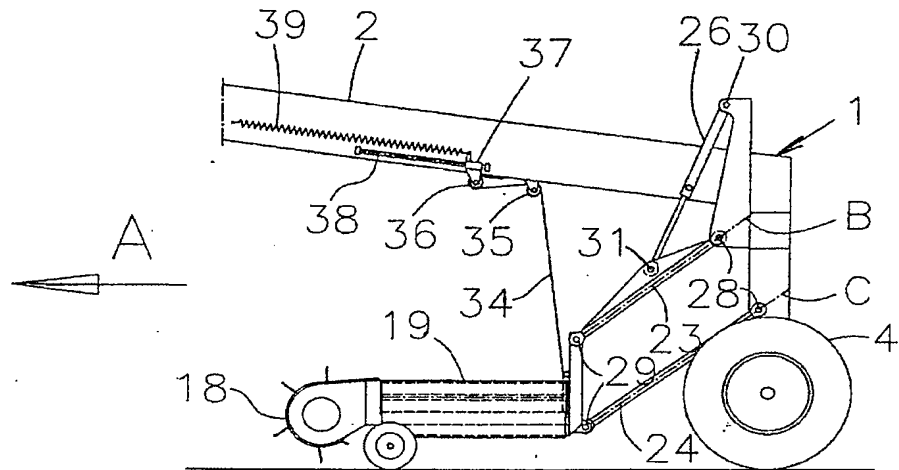


Fig. 6

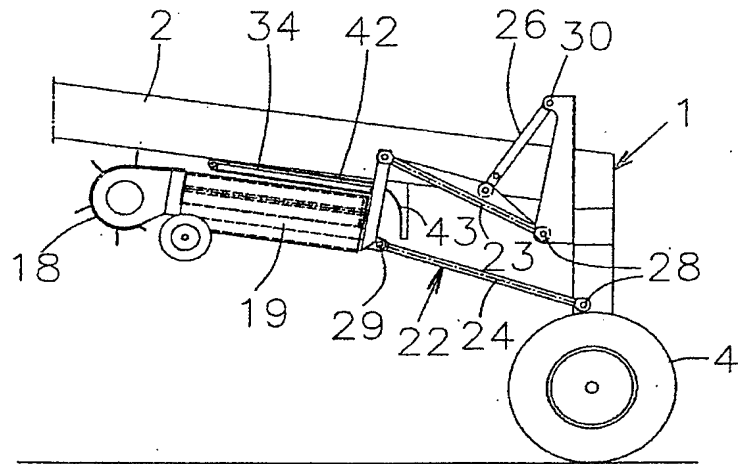
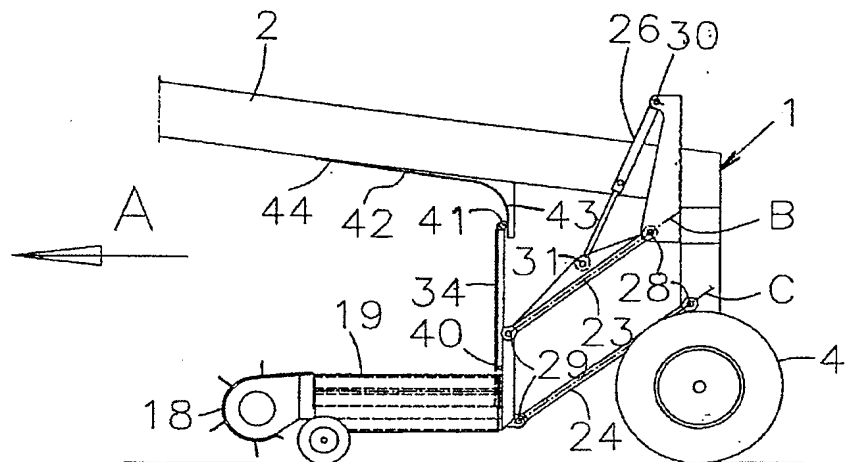


Fig. 5



UTILITY CERTIFICATE

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NATIONAL REGISTRATION NO.		03/03,442	
TITLE OF THE INVENTION (200 characters or spaces maximum) MACHINE FOR GATHERING PRODUCTS SUCH AS GRASS			
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